DIO Provider

CONTEC DIO Board

Version 1.1.2

User's Guide

July 17, 2012

[Remarks]
This provider uses CONTEC API-DIO (WDM) for ORiN2SDK2.0.14 or later. Use the DIO98 provider for the earlier versions of API-DIO (98PC).

[Revision history]

Version	Date	Content
1.0.0.0	2006-02-23	First edition.
1.0.1.0	2008-02-06	Manual was corrected.
1.0.2.0	2008-11-10	Content was changed for WDM.
1.0.2.1	2010-02-10	Error codes were added.
1.1.0.0	2010-09-13	USB devices were supported. LEN=16,32 was added to Variable: IN, OUT, IO options.
1.1.0.1	2011-03-11	Information related to provider registration tool was added.
1.1.1.0	2012-05-25	"DeviceName" option was added.
1.1.2.0	2012-05-28	Meta mode was added.
1.1.2	2012-07-17	Version rule of the document was changed.

[Hardware]

Model	Version	Notes

Contents

1. Introduction 4

2. Outline of Provider 5

2.1. Outline 5
2.2. Methods and properties 6
2.2.1. CaoWorkspace::AddController method 6
2.2.2. CaoController::AddVariable method 6
2.2.3. CaoController::Execute method 7
2.2.4. CaoVariable::get_Attribute property 8
2.2.5. CaoVariable::get_Value property 8
2.2.6. CaoVariable::put_Value property 8
2.3. Variable list 8
2.3.1. Controller class 8
2.4. Error code 9
2.5. CAO-DIO API reference table 10

3. Sample Program 11

1. Introduction

This document is a user's guide of the DIO provider which is used to access CONTEC DIO board.
Refer to CONTEC API-DIO (WDM) Help for details.

NOTE: The DIO device driver of the DIO board needs to be installed to use the DIO provider. Install the driver from API-PAC (W32) for PCI board or from API-USBP (WDM) for USB. After installing it, register the provider in the registry with reference to Table 2-1.

2. Outline of Provider

2.1. Outline

The DIO provider executes DIO (WDM) API corresponding to CAO API at the time the CAO API is executed.

Refer to Table 2-7 for CAO API and corresponding DIO (WDM) API.

The following shows the outline of the provider.

Table 2-1 DIO provider

File name	CaoProvDIO.dll
ProgID	CaoProv.CONTEC.DIO
Registry registration[1]	regsvr32 CaoProvDIO.dll
Remove registry registration	regsvr32 /u CaoProvDIO.dll

[1] Provider registration can be executed by regsvr32.exe or RegCOM.exe ([Start] -> [ORiN2] -> [Tools]). The DIO board driver must be installed to register the DIO provider.

2.2. Methods and properties

2.2.1. CaoWorkspace::AddController method

The DIO provider establishes connection to the DIO board when the Controller object is created. The device name is specified with controller name when connection is established.

```
AddController
(
    "<Controller name>",                    // Device name.
    " CaoProv.CONTEC.DIO",                  // Provider name. Fixed.
    "<Machine name>",                       // Provider execution machine name.
    "<Option>"                              // Option character string.
)
```

Table 2-2 Option character string of CaoWorkspace::AddController

Option	Meaning
DeviceName=[<Device name>]	Device name of the board to be connected[*1] Default: "" (no value specified) For the case of "" (no value specified), the character string specified for controller name will be used as device name.

2.2.2. CaoController::AddVariable method

This method creates a variable object used to access the DIO board.

```
AddVariable
(
    "<Variable name><Logical number>",      // Variable name.
    "<Option>"                              // Option character string.
)
```

Attach a decimal logical number to a variable in 2.3.1, and use it as a variable name.
If a variable other than those in 2.3.1 is specified, or a logical number is not specified with a decimal, this method will return an error.
The meaning of logical number depends on the value of Len option in Table 2-3.

Len=1: Logical bit

Len=8, 16 or 32: Logical port

Refer to CONTEC API-DIO Help for the input value range. This method does not generate an error even if a specified value is out of the input range. An error occurs when get_Value or put_Value is executed.

Following is a list of option string items.

Table 2-3 Option character string of CaoController::AddVariable

Option	Meaning
Len [=<1 | 8 | 16 | 32>]	Specify data length (bit). (Default: 1)
Filter=<Setting value>	Specify digital filter setting value. (Default: No digital filter) Refer to CONTEC API-DIO Help for the effective range.

2.2.3. CaoController::Execute method

Configures interrupt event setting.

This method specifies "SetInterrupt" for the first argument, and parameters in an array for the second argument. See below for details.

Table 2-4 Parameters for ControllerExecute

Element number	Data type	Explanation
1	VT_I2	Input bit number This bit number must be an available bit for interrupt on the hardware.
2	VT_I2	Interrupt logic 0: Mask interrupt 1: Input value 0 -> 1 2: Input value 1 -> 0

```
Execute
(
    "SetInterrupt"          // Command name. Fixed.
    "<Parameter>"           // Parameter (array [1]: Input logical bit number, [2]: Interrupt logic)
)
```

Some USB devices do not support the interrupt method. Refer to API-DIO (WDM) Help for details and check if the interrupt function: DioNotifyInterrupt is available.

2.2.4. CaoVariable::get_Attribute property

Acquires Read/Write attribute information for variables.

Table 2-5 Attribute and corresponding value

Attribute	Value
Read	1
Write	2

2.2.5. CaoVariable::get_Value property

Acquires information corresponding to a variable. For the implementation status and acquired data of each variable, refer to 2.3.1.

2.2.6. CaoVariable::put_Value property

Configures information corresponding to a variable. For the implementation status and setting data of each variable, refer to 2.3.1.

2.3. Variable list

2.3.1. Controller class

Table 2-6 Controller class user variable list

Variable name	Data type	Explanation	Attribute	
			get	put
IN?	VT_UI1*1 VT_UI1|VT_ARRAY*2	Acquire data. Specify the logical port number after the variable name. Example: "IN20"	√	-
OUT?	VT_UI1*1 VT_UI1|VT_ARRAY*2	Set data. Specify the logical port number after the variable name. Example: "OUT20" Read-back is performed for CaoVariable::get_Value.	√	√
IO?	VT_UI1*1 VT_UI1|VT_ARRAY*2	Acquire or set data. Specify the logical port number after the variable name. Example: "IO20" This performs the "IN" variable operation for CaoVariable::get_Value property, and the "OUT" variable operation for CaoVariable::put_Value property.	√	√

* 1: For the case 1 or 8 is specified for the Len option.

* 2: For the case 16 or 32 is specified for the Len option.

2.4. Error code

The DIO provider returns an error number specified by DIO API after masking it with "0x8010000" as a unique error code.

Example: DIO API error 0x0003 -> CAO API error 0x80100003

Refer to CONTEC API-DIO (WDM) Help for details of DIO API.

For common errors of ORiN2, refer to the error code section in "ORiN2 Programming Guide".

2.5. CAO-DIO API reference table

Table 2-7 CAO-DIO API reference table

CAO API	DIO API	Remarks
CaoWorkspace::AddController()	DioOpen()	
CaoWorkspaces::Remove()	DioClose()	
CaoVariable::get_Value()	DioInpBit()	For "IN" or "IO" variable Len option set to 1
	DioInpByte()	For "IN" or "IO" variable Len option set to 8
	DioInpMultiByte()	For "IN" or "IO" variable Len option set to 16 or 32
	DioEchoBackBit()	For "OUT" variable Len option set to 1
	DioEchoBackByte()	For "OUT" variable Len option set to 8
	DioEchoBackMultiByte()	For "OUT" variable Len option set to 16 or 32
CaoVariable::put_Value()	DioOutBit()	For "OUT" or "IO" variable Len option set to 1
	DioOutByte()	For "OUT" or "IO" variable Len option set to 8
	DioOutMultiByte()	For "OUT" or "IO" variable Len option set to 16 or 32

Refer to CONTEC API-DIO Help for details of DIO API.

3. Sample Program

The following sample program shows the code to access the dual port memory with the variable "DPM".

List 3-1 Sample.frm

```
Private caoEng As CaoEngine
Private caoCtrl As CaoController
Private caoVar As CaoVariable

Private Sub Form_Load()

    Set caoEng = New CaoEngine
    Set caoCtrl = caoEng.Workspaces(0).AddController("DIOTest", " CaoProv.CONTEC.DIO ", "","")
    Set caoVar = caoCtrl.AddVariable("IO20", "")
End Sub

Private Sub CmdPut_Click()

    Dim data As Byte
    data = 1

    caoVar.Value = data

End Sub

Private Sub cmdGet_Click()

    Dim Ret As Variant

    Text1.Text = caoVar.Value

End Sub
```